A Preliminary Account of the Water Bugs of the Family Corixidae in Ceylon

BY

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(*With* 43 *figures on four plates*)

INTRODUCTION

The Corixidae are the most abundant of the aquatic Hemiptera in Ceylon, yet relatively few records are available of their occurrence and hardly any data on their biology. A number of species have been described or recorded from Ceylon but later revisions have shown them to be synonyms or they have not been sufficiently authenticated. It is therefore difficult to give a complete list of the species known to occur in Ceylon.

The present paper is intended as a critical review of the literature on the Ceylonese Corixidae and a reliable guide to specific diagnosis based on recent work. Short notes of diagnostic value are given for each species with illustrations. All the species authenticated so far are included except those described by Wroblewski (1964). Short notes on the biology and distribution of each species are given. The material on which the present study is based was collected by the author over a number of years from all parts of Ceylon. It is likely that the species list is therefore fairly complete. The general biology of Corixidae is mentioned briefly.

REVIEW OF LITERATURE

Motschoulsky (1863) described *Corixa albifrons* from Ceylon. Horvath (1904) added another species *Micronecta haliploides*. Kirkaldy (1905) described *Micronecta thelxinoe* and *M. memonides*. Distant (1906) mentions two species *Micronecta striata* (Fieb.) and *M. haliploides*. He included *Micronecta albifrons* as a synonym of *M. striata*. Distant (1910) added records of two new species *Micronecta lucina* and *M. minthe* and listed three others, *Corixa substriata* Uhler, *Micronecta thelxinoe*, and *M. memonides*. Lundblad (1933) listed eight species from previous re-

cords. His list included, besides those mentioned by earlier workers, *Micronecta quadristrigata* Bredd. for the record of *M. minthe*. He also included *Micronecta ovivora* West. in the Ceylonese list. Hutchinson (1940) placed the specific diagnosis of Indian and Ceylonese species on a sound footing. He accepted only two of Lundblad's (1933) records, namely *Micronecta haliploides* and *M. quadristrigata*. Two other species found in Ceylon, *Micronecta albifrons* and *M. scutellaris*, were described. Fernando (1959) recorded *Micronecta quadristrigata*, *M. albifrons*, and *M. haliploides* from temporary habitats. Chen (1960) described two new species from Ceylon, namely *Micronecta tarsalis* and *M. fascioclavus*, and mentioned the occurrence of *M. thyesta*. Wroblewski (1960) added a new species, namely *Micronecta flavens*. Fernando (1961*b*) recorded *Micronecta quadristrigata* and *M. albifrons* at light. Mendis & Fernando (1962) made a list of species, adding *Agraptocorixa hyalinipennis* (F.). Fernando (1963*a*) added five new records, namely *Micronecta ludibunda* Bredd., *M. prashadana* Hutch., *M. siva* Kirk., *M. punctinotum* Chen, and *Tropocorixa pruthiana* Hutch. All these species were recorded by him (Fernando 1963*b*) at light, but *Micronecta ludibunda* was referred to as *M. albifrons*. Wroblewski (1963) described the male of *Micronecta punctinotum* from material sent by the present author, in which he found also *Micronecta* sp. closely similar to *M. issa* Dist. Wroblewski (1964) has a description of a new species from Ceylon, *Micronecta fernandoi* and a redescription of *M. memonides*.

The synonymy of the various species of Corixidae will not be discussed as this has been done by Hutchinson (1940) and Chen (1960). There are however a number of species which are doubtful. They will be discussed later. Detailed descriptions of Ceylonese species are given by Hutchinson (1940), Chen (1960), and Wroblewski (1960) and also by Lundblad (1929, 1933).

A summary of the present position as regards the Corixidae recorded from Ceylon is given at the end of the taxonomic section.

Taxonomy

The genera of Ceylonese Corixidae can be easily separated using the following key :

1. Scutellum visible (Fig. 1).....Micronectinae
Micronecta
Scutellum not visible (Fig. 2).....Corixinae
.....2

2. (*a*) Hemelytra unicolorous : No transverse stripes on pronotum.....
Agraptocorixa

(*b*) Hemelytra with vermiculate markings (Fig. 10) : Pronotum with transverse stripes (Fig. 2).....*Tropocorixa*

The accurate specific diagnosis of the Corixidae leans heavily on the structure of the male genitalia. It is often necessary to dissect out the genital claspers (parameres) and study them in some detail. In the Micronectinae other important characters are the shape of the free lobes of the eighth abdominal tergite and the submedian lobe of the seventh abdominal sternite, the chaetotaxy of the foreleg, and the shape of the palar claw of the male. Females are sometimes difficult to diagnose to species. In the Corixinae, the arrangement of the palar pegs in the foretarsus of the male is usually characteristic. Colour patterns of the pronotum and hemelytra are useful and even distinctive in some species (Figs. 10-19). In the group *Micronecta ludibunda*, *M. siva*, and *M. fascioclavus* the hemelytra have solid lines. In *Micronecta punctata* and *M. punctinotum* there are dark spots. The hemelytra of *Agraptocorixa hyalinipennis* are unicolorous, whilst that of *Tropocorixa pruthiana* have vermiculate markings. The markings on the pronotum are distinctive in some species. In *Micronecta siva* and *M. fascioclavus* there are solid dark markings (Figs. 5, 6). In *Tropocorixa pruthiana* (Fig. 2) the dark markings are closely crowded. In *Micronecta punctinotum* there are punctations (Fig. 3). With practice many of the species can be recognized in the field. The Corixinae are much larger than the Micronectinae, the former measuring 5-10 mm. in length whilst the latter rarely exceed 3 mm. Amongst the Micronectinae the largest species is *Micronecta scutellaris*, whilst the smallest are the group *M. tarsalis* and the two others which have been described by Wroblewski (1964).

Agraptocorixa hyalinipennis (F.)

(Fig. 20)

This is the largest species found in Ceylon. It measures 6-7 mm. in length and is over 3 mm. in maximum breadth. The pronotum and hemelytra are unicolorous except for a small oval dark spot on the latter; this feature separates it from the only other large corixid, *Tropocorixa pruthiana*, which has dark transverse markings on the pronotum and vermiculate markings on the hemelytra. The parameres are shown in Fig. 20.

It has been collected in stagnant forest ponds in Ratmale (near Maho) ; Wilpattu National Park ; Palatupana, Yala ; Kirinda ; and Ambalantota. In Ceylon it appears to be restricted to the drier parts and occurs in forest ponds with an abundance of vegetation. The author collected the species from Malaya and Burma from highly polluted ponds without much vegetation. Jaczewski (1962) gives the distribution as India, Burma, Viet Nam, Indonesia, and Japan.

Tropocorixa pruthiana Hutch.

(Figs. 10, 21)

This species measures 5-5.5 mm. in length and about 2.5 mm. in maximum breadth. The pronotum has seven transverse yellow lines the second, third, and fourth of which are broken. The hemelytra show vermiculate markings (Fig. 10). It is characterised by these features and the structure of the parameres (Fig. 21).

It has been collected from Ambalantota, Kirinda and Amupitiya (near Belihul-oya), and Kande-ela—in the first two localities in forest ponds together with *Agraptocorixa hyalinipennis* and in Amupitiya from a stream in a terraced paddy field. Hutchinson (1940) placed it in a group of species occurring at elevations of 700-1000 ft. in India. It has so far been recorded only from India and Ceylon, where it occurs over a wide range of elevations.

Corixa substriata recorded from Ceylon by Distant (1910) probably refers to this species.

Micronecta thyesta Dist.

(Figs. 11, 22, 33)

This is a medium-sized elongate species with light-coloured hemelytra which gives it a distinctive appearance amongst the *Micronecta* species found in Ceylon. The hemelytra are markedly pubescent with long close-set hairs. It is the only species without a strigil. The parameres (Fig. 22) and the free lobe of the eighth abdominal tergite (Fig. 33) are characteristic.

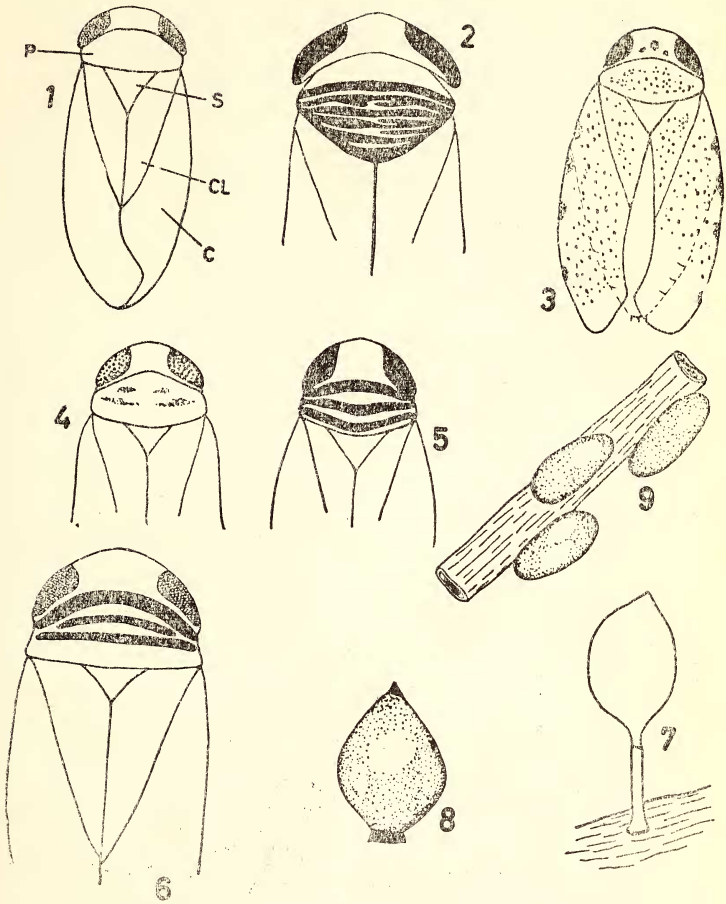
It has been recorded from Ceylon by Chen (1960) and by Fernando (1963*a*). In the material examined it was a common species in ponds in the southern part of Ceylon.

It has been recorded from India, Malaya, Taiwan, Ceylon, and Thailand.

Micronecta scutellaris Stal.

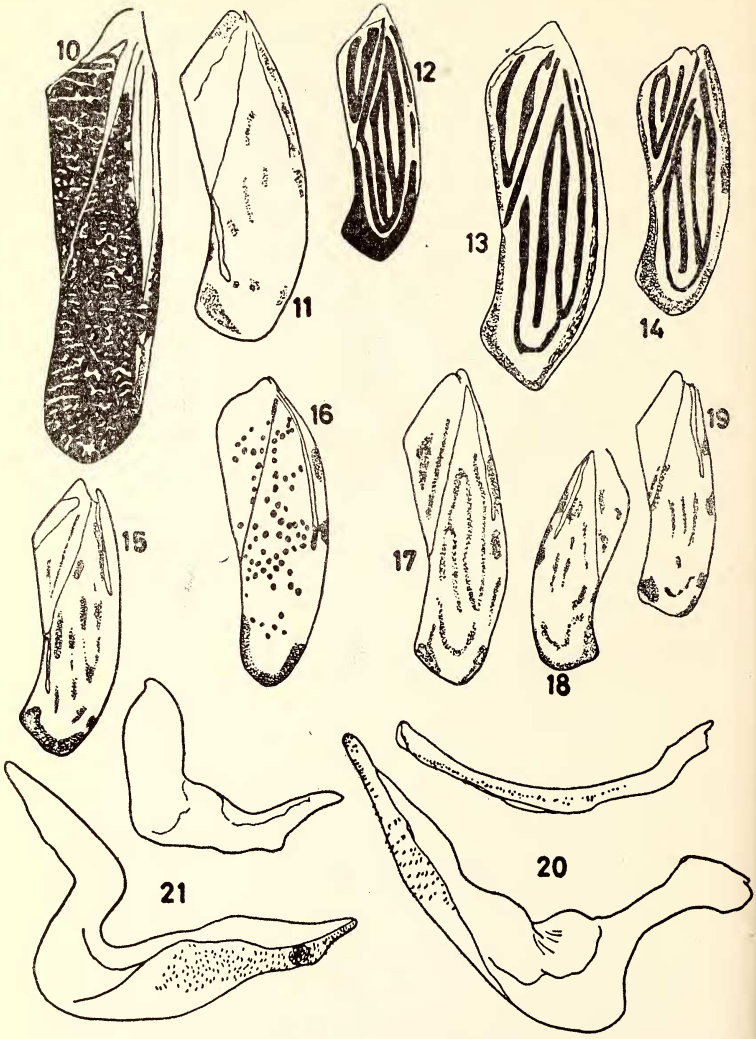
(Figs. 15, 27, 39)

Of the species of *Micronecta* this is the largest, measuring over 3 mm. in length. The hemelytra show a considerable variation in markings but there is usually a series of broken lines in both clavus and corium (Fig. 15). The hemelytra are pubescent. The left paramere is rugose in its terminal portion, the rugosities extending about halfway along its length and running across the shaft (Fig. 27). The free lobe of the eighth abdominal tergite is shown in Fig. 39.



Corixidae of Ceylon

Fig. 1. *Micronecta* : P. pronotal shield, S. scutellum, CL. clavus, C. corium ; 2. *Tropocorixa* showing pronotal markings ; 3. *Micronecta punctinotum* ; 4-6. *M. ludibunda*, *M. fasciclavus*, and *M. siva*, showing pronotal markings ; 7. Egg of *Agraptocorix hyalinipennis* ; 8. Egg of *Tropocorixa pruthiana* ? (obtained from gravid female) ; 9. Eggs of *Micronecta*



Corixidae of Ceylon

Figs. 10-19. Hemelytra: 10. *Tropocorixa*; 11. *Micronecta thyesta*; 12. *M. ludibunda*; 13. *M. siva*; 14. *M. fascioclavus*; 15. *M. scutellaris*; 16. *M. punctata*; 17. *M. quadristrigata*; 18. *M. prashadana*; 19. *M. flavens*; 20-21, Parameres (left longer than right); 20. *Agraptocorixa hyalinipennis*; 21. *Tropocarixa pruthiana*

Micronecta scutellaris is perhaps the most widely distributed species of *Micronecta* in south-east Asia. It has been recorded from both the Oriental and the Ethiopian regions. It occurs in Africa, India, Burma, China, Ceylon, and Malaya.

In Ceylon it occurs in a wide variety of habitats. It has been collected in ponds, irrigation reservoirs, and brackish water. It has been recorded at light in Malaya (Fernando 1961*a*).

Micronecta ludibunda Bredd.

(Figs. 4, 12, 23, 35)

Superficially this species resembles *Micronecta siva* and *M. fascioclavus*. It is however distinctly smaller than *Micronecta siva* and lacks solid transverse lines in the pronotum (Fig. 4) which are found in both *M. siva* and *M. fascioclavus*. The parameres resemble those of *Micronecta fascioclavus* but are distinctive (Fig. 23). The free lobe of the eighth abdominal tergite is shown in Fig. 35.

The species described as *Micronecta albifrons* from Ceylon might well refer to this species, although it is more likely to be *M. fascioclavus*. Unfortunately, the type of *Micronecta albifrons* is no longer available (Wroblewski 1962*a*). Ceylonese material has been referred to this species in the past by Hutchinson (1940) and Fernando (1959, 1963*b*). The present material agrees closely with *Micronecta ludibunda* and is hence placed in this species, but in it were some specimens which had an added prominence near the base of the shaft of the right paramere not found in *Micronecta ludibunda* from Malaya and Indonesia.

The position of *Micronecta albifrons* and *M. ludibunda* is further complicated by Kirkaldy's (1905) species, *Micronecta thelxinoe* from Ceylon, and the forms described as *M. striatella* and *M. inconspicua* by Lundblad (1933) from Indonesia, which are probably all *M. ludibunda*. We have here, perhaps, a species complex and the status of the various forms needs a critical reassessment very badly.

Micronecta ludibunda has been recorded from Malaya, India, and Ceylon. According to Hutchinson's (1940) definition both Ceylonese and Malayan material belongs to *Micronecta albifrons*. It is therefore difficult to give exact limits for this species.

Micronecta siva Kirk.

(Figs. 6, 13, 24, 36)

This species is second in size to *Micronecta scutellaris*. Its coloration is distinctive. The corium has four prominent longitudinal stripes (Fig. 13) and the pronotum three thick transverse dark lines (Fig. 6). The

parameres (Fig. 24) differ markedly from those of *Micronecta ludibunda* and *M. fascioclavus*. The free lobe of the eighth abdominal tergite (Fig. 36) is somewhat similar to that of *Micronecta ludibunda*, but the posterior margin has an elevation.

Hutchinson (1940) states that all the specimens he examined had been collected at light. This species has been collected at light in Ceylon (Fernando 1963*a*). Distant (1906) states that his material came from a tank (irrigation reservoir). Hutchinson (loc. cit.) states that they probably live in the shallow water of large rivers. In Ceylon it has been collected from ponds bordering a river. It is likely that its normal habitats are ponds, which is true for the majority of Ceylonese species.

Micronecta siva has been recorded from India and Ceylon. Lundblad (1933) also records it from China under the name *Micronecta striata*. Earlier records of this species should be accepted with caution because of the lack of suitable criteria of separation between it and a number of closely related species at that time.

Micronecta fascioclavus Chen

(Figs. 5, 14, 25, 37)

It can be easily recognised by the three longitudinal stripes on the clavus (Fig. 14). This separates it from *Micronecta siva* and *M. ludibunda*. In size it is similar to the latter species. The parameres (Fig. 25) although resembling those of *Micronecta ludibunda* are distinctive and so is the free lobe of the eighth abdominal tergite (Fig. 37).

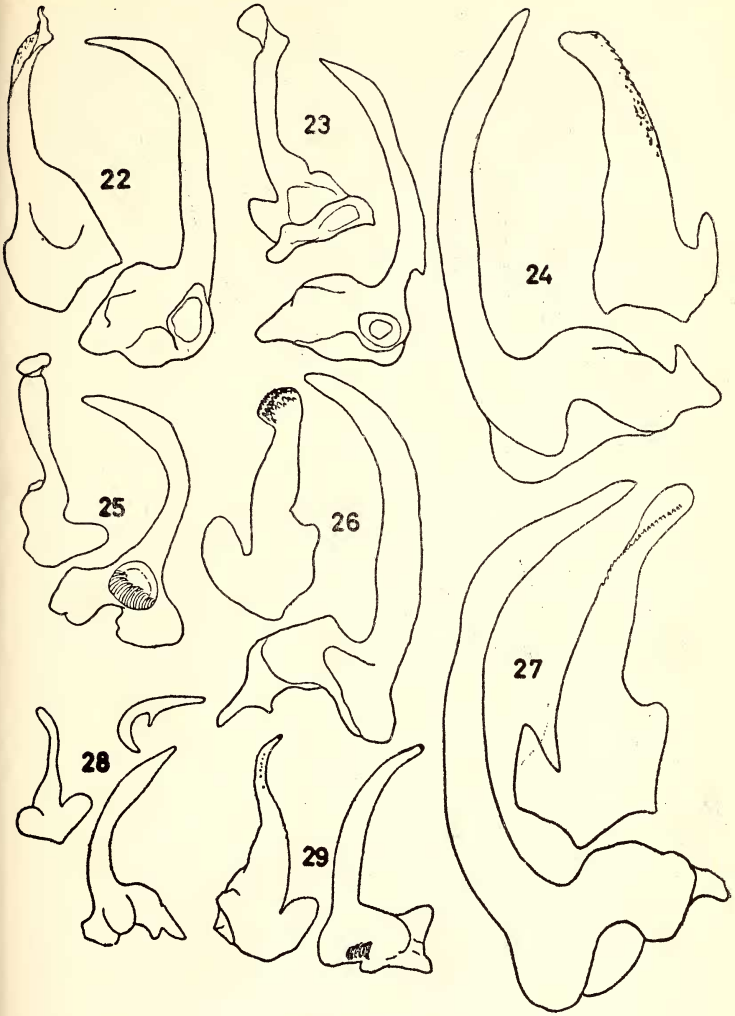
Micronecta fascioclavus was described from material collected in Colombo by Chen (1960). A large number were taken at light by the present author and also collected from ponds. There is a possibility that this species is in fact *Micronecta albifrons*, the types of which came from Colombo. It appears endemic to Ceylon.

Micronecta tarsalis Chen

(Figs. 28, 43)

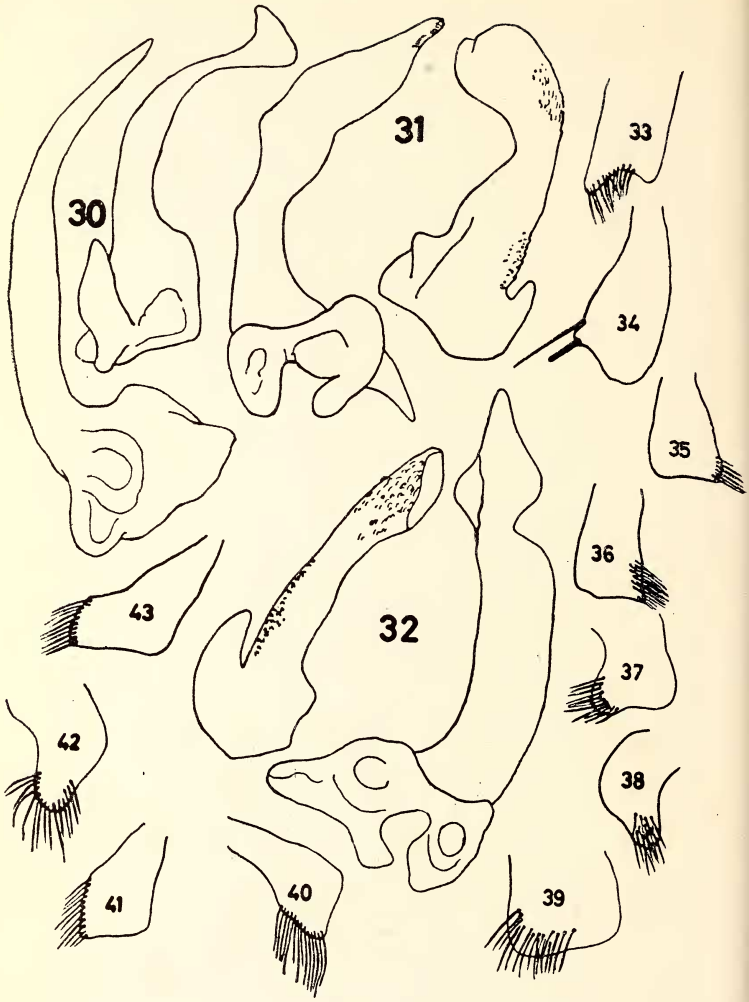
As its name indicates *Micronecta tarsalis* has a characteristic tarsal claw, with a tooth placed subapically in the foretarsus of the male. It is a small species with indistinct hemelytral markings and only brachypterous individuals are known. The parameres (Fig. 28) and the free lobe of the eighth abdominal tergite (Fig. 43) have been figured after Chen (1960).

I have not collected this species but found a number of specimens having a tarsal claw at the bottom of a waterfall at Diyaluma. They



Corixidae of Ceylon

Parameres (right longer than left) : Fig. 22. *Micronecta thyesta* ; 23. *M. ludibunda* ; 24. *M. siva* ; 25. *M. fascioclavus* ; 26. *M. punctata* ; 27. *M. scutellaris* ; 28. *M. tarsalis* and tarsal claw of same species ; 29. *M. punctinotum*



Corixidae of Ceylon

Figs. 30-32. Parameres (right longer than left) : Fig. 30. *Micronecta quadristrigata* ; 31. *M. flavens* ; 32. *M. prashadana* ; Figs. 33-43. Free lobe of eighth abdominal tergite : 33. *Micronecta thyesta* ; 34. *M. punctinotum* ; 35. *M. ludibunda* ; 36. *M. siva* ; 37. *M. fasciclavus* ; 38. *M. punctata* ; 39. *M. scutellaris* ; 40. *M. flavens* ; 41. *M. prashadana* ; 42. *M. quadristrigata* ; 43. *M. tarsalis*

proved to belong to the new species of *Micronecta* which has been described by Wroblewski (1964) as *M. fernandoi*.

The tarsal claw is probably an adaptation for mating.

Micronecta punctata (Fieb.)

(Figs. 16, 26, 38)

Until Chen (1960) established the synonomy of this species with *Micronecta haliploides*, the Ceylonese material was placed under the latter species. *Micronecta punctata* is the darkest species amongst the Ceylonese *Micronecta* in life. It is also broader than the other species relative to its length. The markings on the hemelytra are characteristic, consisting of large spots (Fig. 16). The parameres are shown in Fig. 26 and the free lobe of the eighth abdominal tergite in Fig. 38.

In Ceylon it is not a common species. It occurs in ponds and temporary habitats. It has also been recorded at light. It occurs in India, Ceylon, and Malaya.

Micronecta punctinotum Chen

(Figs. 3, 29, 34)

Superficially similar to *Micronecta punctata*, but much lighter in colour and smaller in size. The hemelytra and pronotum have punctations irregularly distributed (Fig. 3). The male was described from material identified for the present author by Wroblewski (1963) from whose paper the parameres (Fig. 29) and the free lobe of the eighth abdominal tergite (Fig. 34) have been figured.

This species has so far been recorded from India and Ceylon. It was taken at light by Fernando (1963*a*).

Micronecta quadristrigata Bredd.

(Figs. 17, 30, 42)

The commonest species in many countries of south-east Asia. It is of medium size with indistinct markings on the hemelytra (Fig. 17). The parameres (Fig. 30) are characteristic. The free lobe of the eighth abdominal tergite (Fig. 42) is angulate.

Micronecta quadristrigata has been recorded from Ceylon, India, Malaya, Viet Nam, Thailand, Philippines, Hong Kong, and Iran. It is common in paddy fields (Ardiwinata 1957, Fernando 1959). It is also the commonest species at light. It has been taken at light in India, Ceylon, Indonesia, Malaya, and more recently in Viet Nam (Wroblewski 1962*b*).

In Ceylon it occurs in paddy fields, ponds, irrigation reservoirs, and small pools both temporary and ephemeral, showing its great mobility.